



Engineering water for the world

Texas A&M University tackles a water crisis

Texas A&M University students and professors are helping shape the world, one pot at a time.

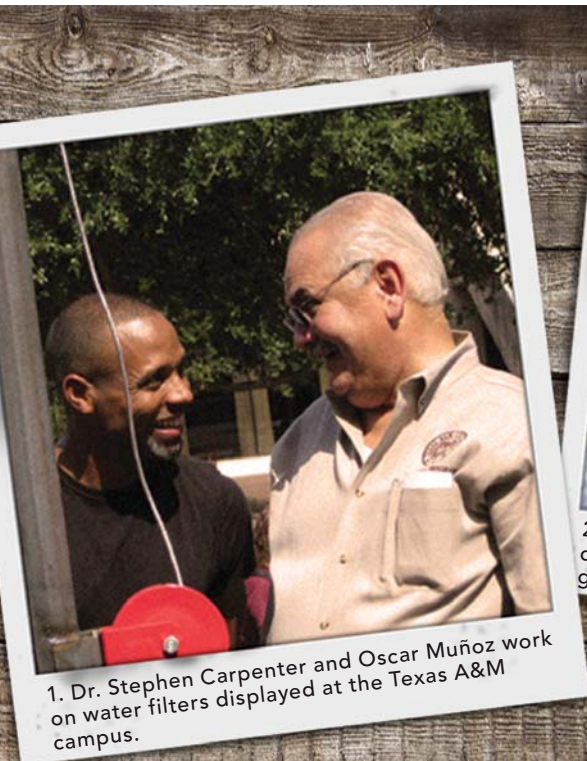
Since 2007, the Texas A&M University Water Project has been linking individuals in the Department of Teaching, Learning, and Culture with those in the Center for Housing and Urban Development and the Zachry Department of Civil Engineering to produce and distribute ceramic point-of-use water filters. These 'pots' are forms of low-cost water treatment that can be used anywhere in the world to prevent needless deaths and poor health.

The water filters are made from 50 percent clay and 50 percent sawdust and contain colloidal silver, which renders bacteria and microbes inert. It turns out something as simple as ceramic pots are one answer to the global potable water crisis.

"Three hundred children across our globe die every hour from diarrheal diseases caused by a lack of access to clean water, sanitation, and adequate healthcare" said Dr. Bryan Boulanger, assistant professor in the Zachry Department of Civil Engineering at Texas A&M. "The overwhelming majority of these deaths are 100 percent preventable through improved access to potable water and sanitation."

Boulanger became involved in the water project in 2007 when he met Dr. Stephen Carpenter, associate professor of Art Education and Visual Culture at Texas A&M, in a grant writing workshop. Carpenter was writing a proposal to fabricate ceramic point-of-use water filters and distribute them for use in the colonies.

Carpenter had already begun the water project with his co-director, Oscar Muñoz, deputy director of The Colonias Program in the Center for Housing and Urban Develop-



1. Dr. Stephen Carpenter and Oscar Muñoz work on water filters displayed at the Texas A&M campus.



2. Dr. Stephen Carpenter pours a 50 percent clay and 50 percent sawdust mixture in the group's garage workroom during Filter Fridays.



3. Dr. Stephen Carpenter and Dr. Bryan Boulanger combine the mixture.

ment at Texas A&M. “Our program works with communities known as colonias,” Muñoz said. “There are approximately 2,300 communities along the 1,434-mile Texas border in 14 counties contiguous to the Rio Grande.” In the colonias, more than half a million people live without running water in their homes or proper sewage.

“I was also familiar with the water quality challenges in the colonias, but I was concerned about the levels of arsenic and other contaminants in the water that might pass through filters,” Boulanger said.

Carpenter introduced Boulanger to Muñoz, and from then on, the three have become “partners in crime,” as Muñoz calls them. But really, they are partners in a vision to address community-specific water and energy needs by developing programs that couple innovative education approaches and technology-based solutions to improve communities and achieve sustainability.

Boulanger said the filter project is a good start for that vision. “I believe we can reduce diarrheal disease by 65 percent or more in communities just by introducing these filters with appropriate education materials. That

equates to millions of lives saved within my own lifetime, which is something worthy of spending time, energy, and effort on.”

The water project didn’t invent ceramic point-of-use water filters. “We have based our work on the international work of Potters for Peace,” Carpenter said. Potters for Peace is a U.S.-based non-profit network of potters, educators, technicians, and volunteers who work primarily in Central America training organizations to operate filter making facilities.

“Ceramic artist Richard Wukich, a friend and mentor, first introduced me to the water filters, and as I read about the work of Potters for Peace, I thought about how this technology might be applied here in Texas to help people who need access to clean drinking water,” Carpenter said.

According to the Potters for Peace Web site, studies done by Massachusetts Institute of Technology, The United Nations Children’s Fund, and the University of Colorado have proven that the filter is effective at eliminating at least 99 percent of *E. coli*, coliform, and *Streptococcus* organisms. ➡



4. Dr. Bryan Boulanger shapes the clay and sawdust mixture.



5. A finished filter.



6. The finished product: a ceramic filter rests on the rim of a 5-gallon water container.



Several hundred thousand of these potable water filters are already used globally, but Boulanger said these existing filters have limitations. “An inability to remove arsenic is just one limitation,” he said.

Boulanger and Ishan Desai, a graduate student and research assistant, have begun experimenting with nanotechnology-based treatment alternatives, an emerging field of water purification science.

“Metal oxide nanoparticles have a high potential to bind and effectively remove arsenic from contaminated water,” Boulanger said. “If we can get the nanoparticles to stay on the surface or within the body of the filter, the filter will have the capacity to remove arsenic.”

Other limitations the project is facing include breakage, cost for production (\$5 per filter is too expensive for many across the globe), and transportation costs of both materials and finished products if not made locally. Each limitation is being addressed as project members change filter design and develop educational materials that will allow people to reproduce filters using existing cultural and community knowledge.

The group was recently granted space by the Webb County Commissioners Court to build a point-of-use ceramic water filter production and education center at the Highway 359 Self Help Center in Laredo, Texas.

Currently Carpenter, Muñoz, Boulanger and eight student volunteers meet weekly in Carpenter’s garage for “Filter Fridays,” but a site at the Texas A&M Riverside campus has recently been granted to create a water filter facility. The gentlemen hope to begin building the facility and their first kiln later this spring.

To see a short documentary video about the Texas A&M Water Project, visit <http://itunes.tamu.edu/>, enter the iTunes U Web page, and type “Clean Water for Texas” in the search tool.

To learn more about the project, visit <http://tamuwaterproject.wordpress.com/>, and to read about international efforts of potters visit <http://www.pottersforpeace.org/>. For more information about the Colonias Program, go to <http://chud.tamu.edu>. 